RESULTS

All of the information in this section is taken directly from the CFWCS (FWP 2006), Montana Field Guide (MNHP 2013a; MNHP and FWP 2013a), the SOC list (MNHP and FWP 2013b), and recommendations from the SWAP Technical Teams (personal communications). Any additional citations are listed.

AQUATIC COMMUNITY TYPES OF GREATEST CONSERVATION NEED

Conservation at the community type level provides the potential to leverage conservation resources to benefit large numbers of species. Community types also provide a way to associate numerous species through common habitat requirements. These communities often face similar conservation concerns that can be addressed simultaneously. The aquatic community types in this section have been identified as Tier I CTGCN, and efforts should be made to address the conservation actions identified for these community types across the state regardless if they fall within a Focal Area (Appendices J-M). However, the Focal Areas identify geographic areas that offer some of the greatest potential to conserve CTGCN and SGCN.

The ATT identified all streams and rivers as Tier I community types. In addition, 54 lakes and nine reservoirs were identified as Tier I community types because of their importance in part or all of the life cycle of certain SGCN. Please see the individual community types in this section for the Tier I maps.

INTERMOUNTAIN VALLEY RIVERS AND STREAMS

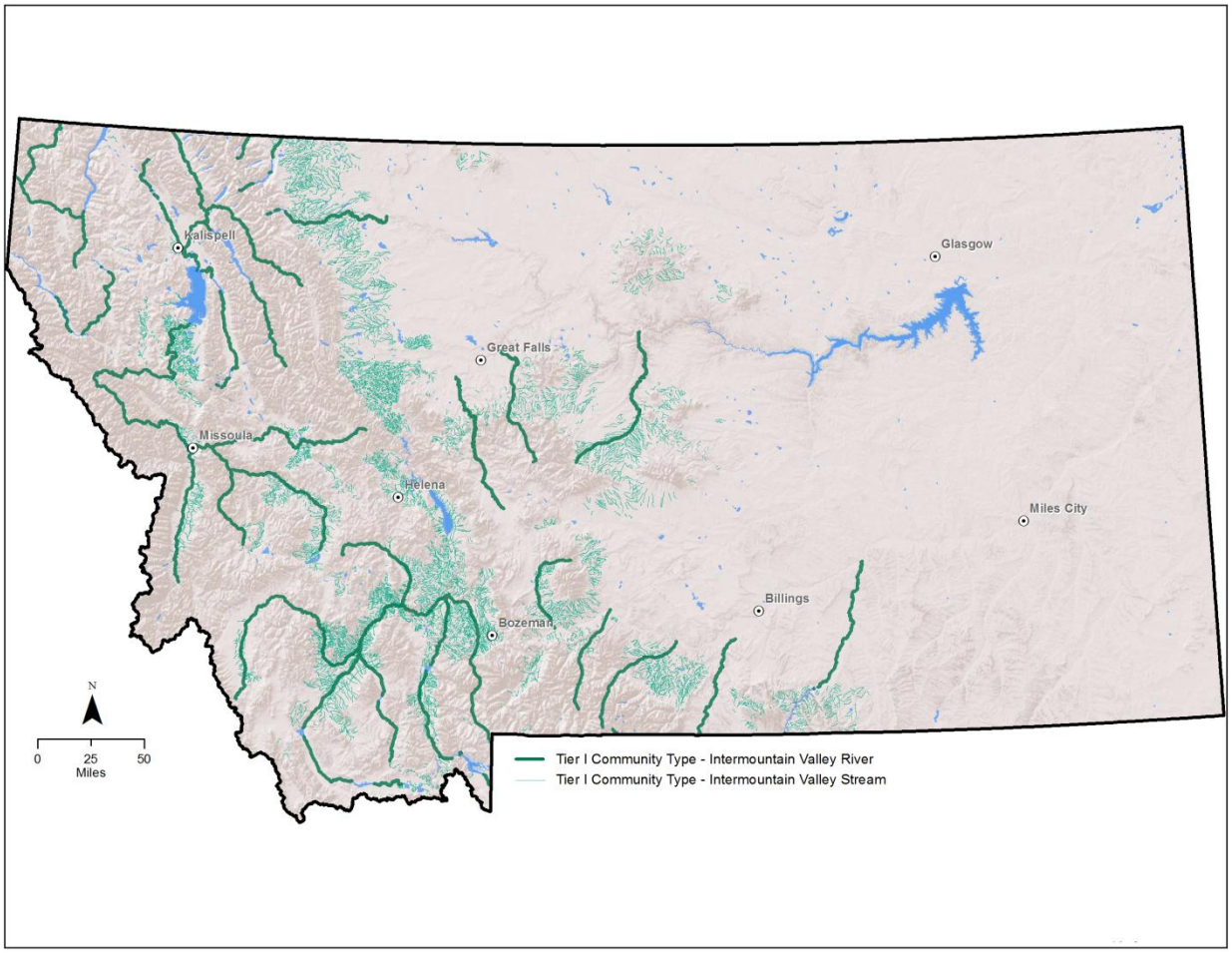

Figure 3. Distribution of Intermountain Valley Rivers and Streams

INTERMOUNTAIN VALLEY RIVERS **1,483 miles**

These low to moderate elevation rivers originate in the Canadian Rockies, Middle Rockies, and Northern Rockies Ecoregions, and continue into intermountain valleys or the eastern prairies. The lower reaches of these rivers are confined to open valleys. They have permanent flow, but several are regulated by impoundments (e.g., Madison, Flathead, Kootenai, Big Horn).

The upland areas are typically comprised of coniferous forest, grassland, and cottonwood-willow vegetation communities. Typical fish assemblages include cold water species including threatened bull trout, endangered white sturgeon, Arctic grayling, cutthroat trout, and various dace and sculpin. Sauger are found in the lower reaches of the Judith River.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals have significantly impacted this community type. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish
Arctic Grayling
Blue Sucker
Bull Trout
Columbia River Redband Trout
Northern Redbelly Dace
Pygmy Whitefish
Sauger
Spoonhead Sculpin
Sturgeon Chub
Torrent Sculpin
Westslope Cutthroat Trout
White Sturgeon
Yellowstone Cutthroat Trout

Mollusk
Western Pearlshell

INTERMOUNTAIN VALLEY STREAMS **5,041 miles**

This community type is found in mountainous, moderate-to-high elevation (3,900-8,200 feet), forested, moderately confined-channel streams of the Canadian Rockies, Middle Rockies, and Northern Rockies Ecoregions. The stream sizes are generally small-to-medium (1^{st}-3^{rd} order, average wetted width is 10-16 feet). The average summer water temperature is <60°F. While there is permanent flow in these streams, there is strong seasonal variability due to melting snowpack. These streams are the transition from the headwater or forested stream communities to the lower foothills and intermontane rivers. This community type provides important habitat for Montana's native cutthroat trout populations. The substrate is dominated by cobbles and boulders, with gravel in the short pools. The geomorphology is normally a riffle/run/pool configuration. Large woody debris often provides channel material.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have negatively impacted this community type the most (Winston et al. 1991). Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish
Arctic Grayling
Bull Trout
Northern Redbelly Dace
Sauger
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

MIXED SYSTEMS **916 miles**

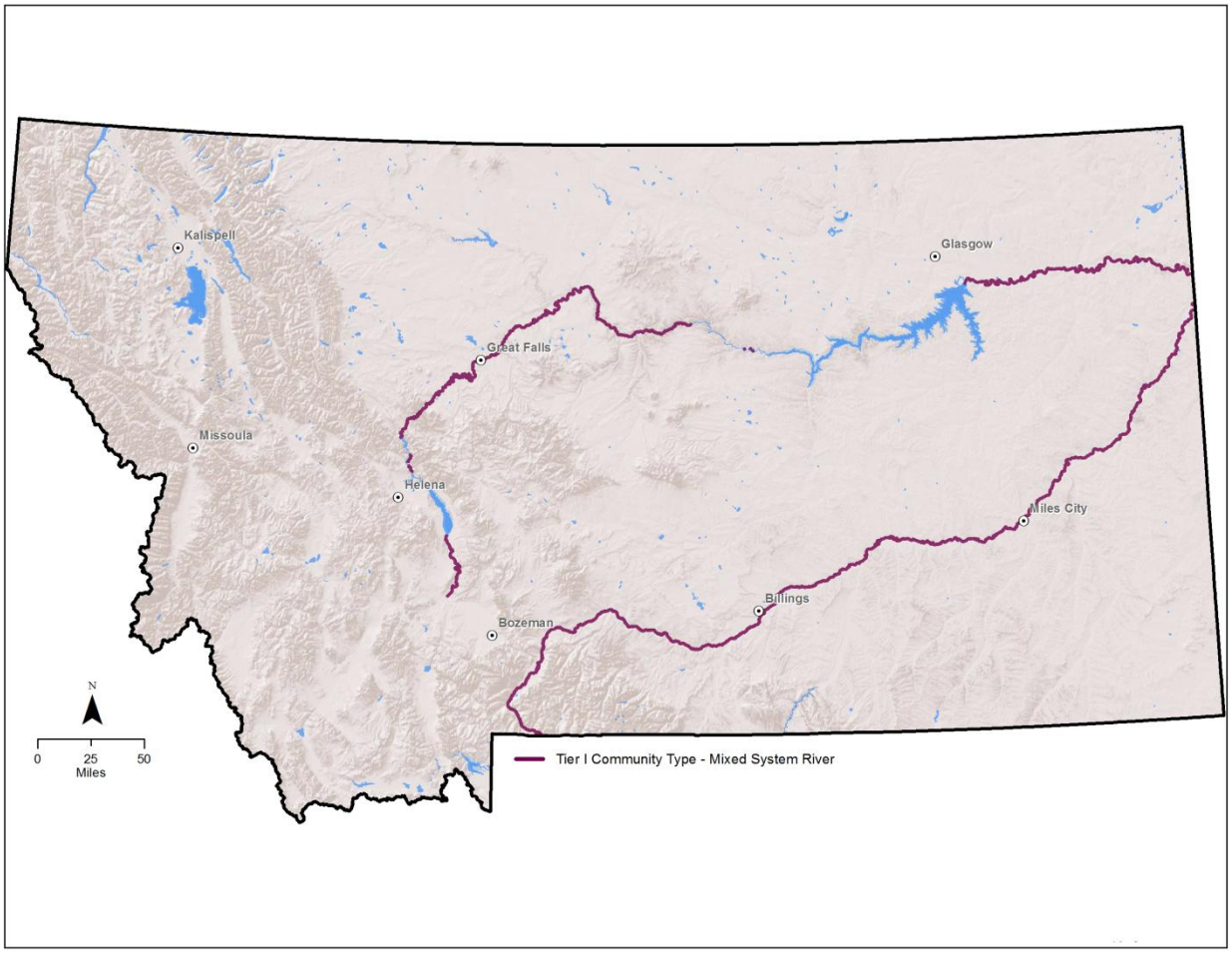

Figure 4. Distribution of Mixed Systems

These systems are characterized by lower gradient runs and riffles with small cobble, gravel, and sands. The upland habitat type is typically cottonwood valley bottoms.

Headwater reaches of this community type transition from cold water trout species to cool and warm water species in middle and lower reaches. This system is considered critical habitat for endangered pallid sturgeon, and a large number of SGCN including sauger, blue sucker, shortnose gar, paddlefish, and sicklefin chub.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have significantly impacted this community type. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport. Specifically, the Missouri River is significantly impacted by upper Missouri Reservoir dams and the Fort Peck dam. Likewise, tributary impoundments partially impact the lower Yellowstone, and low-head dams on the Yellowstone mainstem impact the movement of many SGCN.

Associated SGCN

Fish

Blue Sucker
Iowa Darter
Northern Redbelly Dace
Paddlefish
Pallid Sturgeon
Sauger
Shortnose Gar
Sicklefin Chub
Sturgeon Chub
Yellowstone Cutthroat Trout

MOUNTAIN STREAMS **31,789 miles**

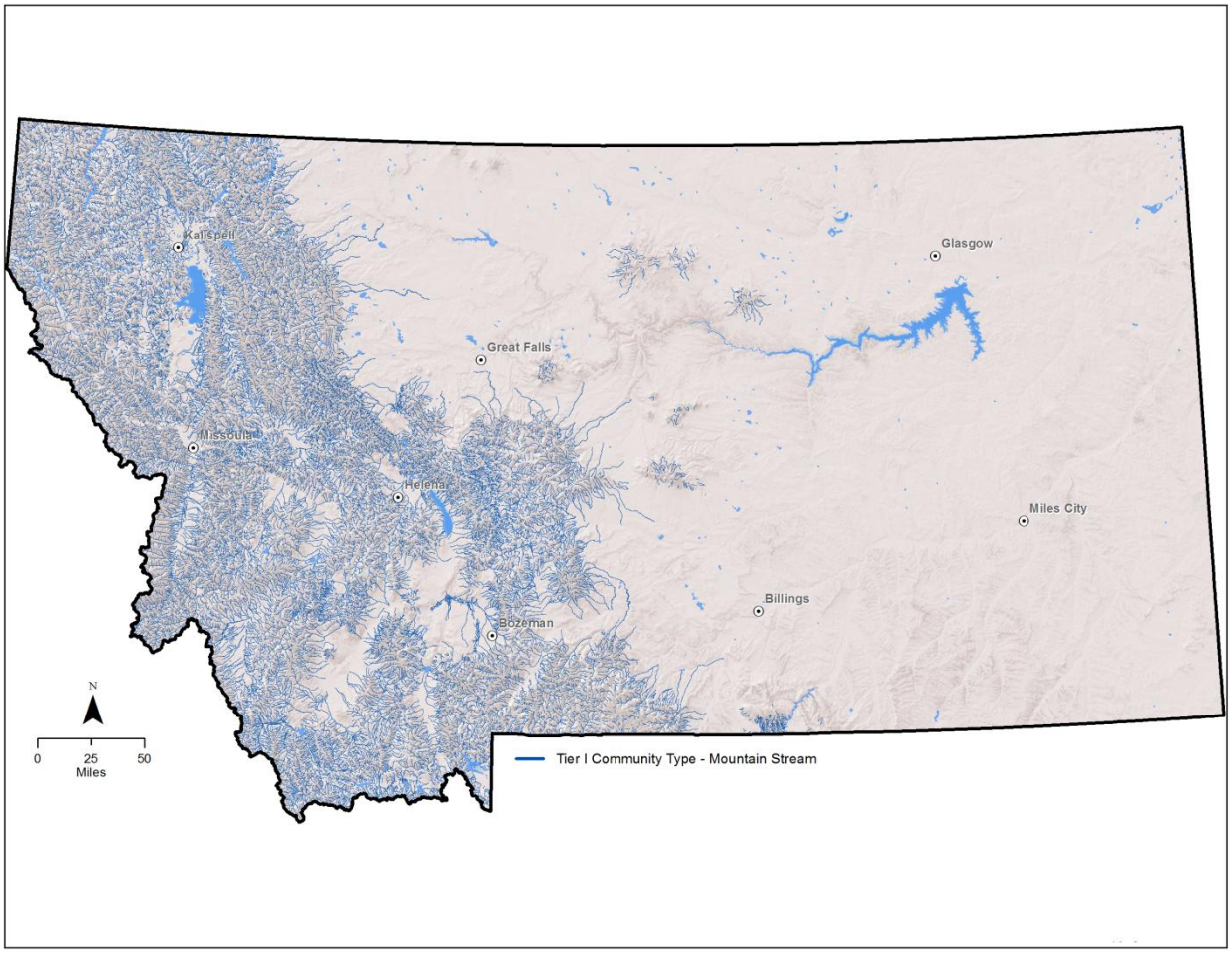

Figure 5. Distribution of Mountain Streams

Mountain streams of western and central Montana are typically cold and clear, and serve as the headwaters for all major river systems in Montana. Mountain streams often flow through montane conifer forests starting at the highest elevations, and can range diversely from high-alpine, steep-gradient reaches to low-gradient, meadow stream types (Stagliano 2005). Abundant native fish species thrive in these waters and are sought after by anglers from around the country.

Many of these native species are declining due to habitat degradation, dams, hybridization, overfishing, and being outcompeted by introduced salmonids. The remaining genetically pure stocks of Montana's Yellowstone cutthroat trout (YCT), westslope cutthroat trout (WCT), and bull trout are found in some of these streams.

Associated SGCN

Fish
Arctic Grayling
Bull Trout
Columbia River Redband Trout
Lake Trout
Northern Redbelly Dace
Northern Redbelly x Finescale Dace
Pygmy Whitefish
Torrent Sculpin
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mollusk
Western Pearlshell

PRAIRIE RIVERS AND PRAIRIE STREAMS

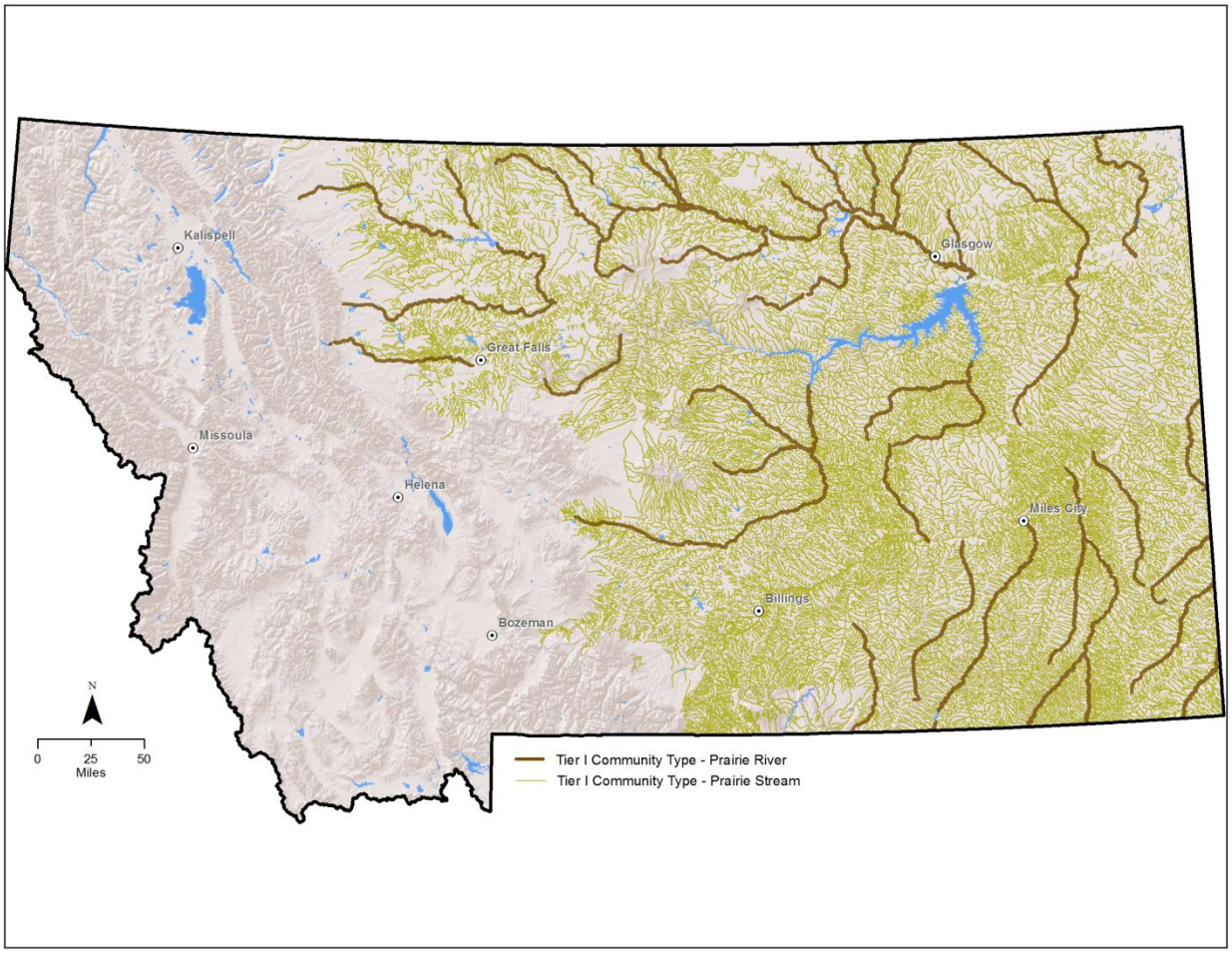

Figure 6. Distribution of Prairie Rivers and Prairie Streams

PRAIRIE RIVERS **3,382 miles**

This low elevation (below 3,900 feet) community type is comprised of large (4th and 5th order and larger; >100 river miles long; 50-115 feet average wetted width) warm water rivers that have low to moderate gradients. The characteristics of this community type are long, deep runs; pools (two to seven feet deep); and interspaced riffles. The substrate is typically comprised of cobble riffles (when present) to sand and gravel dominated runs and pools. Important fish habitat is found in the lower reaches of the rivers where large woody debris, deep pools, and undercut banks are found. These lower sections of the rivers also provide many miles of spawning and nursery habitat for warm water fishes during the spring and early summer.

Disruption of natural water flow, such as diversions, flood control, hydroelectric dams, bank armoring, and irrigation withdrawals, have negatively impacted this community type the most (Winston et al. 1991). Barriers to necessary long distance spawning created by diversion dams and submerged spawning habitat by reservoirs have negatively impacted reproduction. Below dams, reaches are impacted by altered water temperatures, introduced fish, unnatural water level fluctuations, and changes in sediment and nutrient transport.

Associated SGCN

Fish
Blue Sucker
Iowa Darter
Northern Redbelly Dace
Northern Redbelly x Finescale Dace
Paddlefish
Pallid Sturgeon
Pearl Dace
Sauger
Shortnose Gar
Sicklefin Chub
Sturgeon Chub

PRAIRIE STREAMS **29,264 miles**

Prairie Streams in Montana have water either intermittently or permanently flowing through them in an otherwise dry region. These low-elevation streams east of the Rocky Mountains are warmer than their counterparts in western Montana and support a richer and quite different variety of fish. Many of these streams are slow moving and sometimes turbid and weedy, while those in the northern glaciated plains can be as clear as a mountain stream. They offer good rearing habitat for associated fish species, support many amphibians and reptiles, and are crucial for populations of terrestrial wildlife (Stagliano 2005).

The interruption of water flow, such as with small dams, water diversions, and stock ponds has negatively impacted Prairie Streams (Winston et al. 1991).

Associated SGCN

Fish
Iowa Darter
Northern Redbelly Dace
Northern Redbelly x Finescale Dace
Pearl Dace
Sauger
Sturgeon Chub

LAKES AND RESERVOIRS

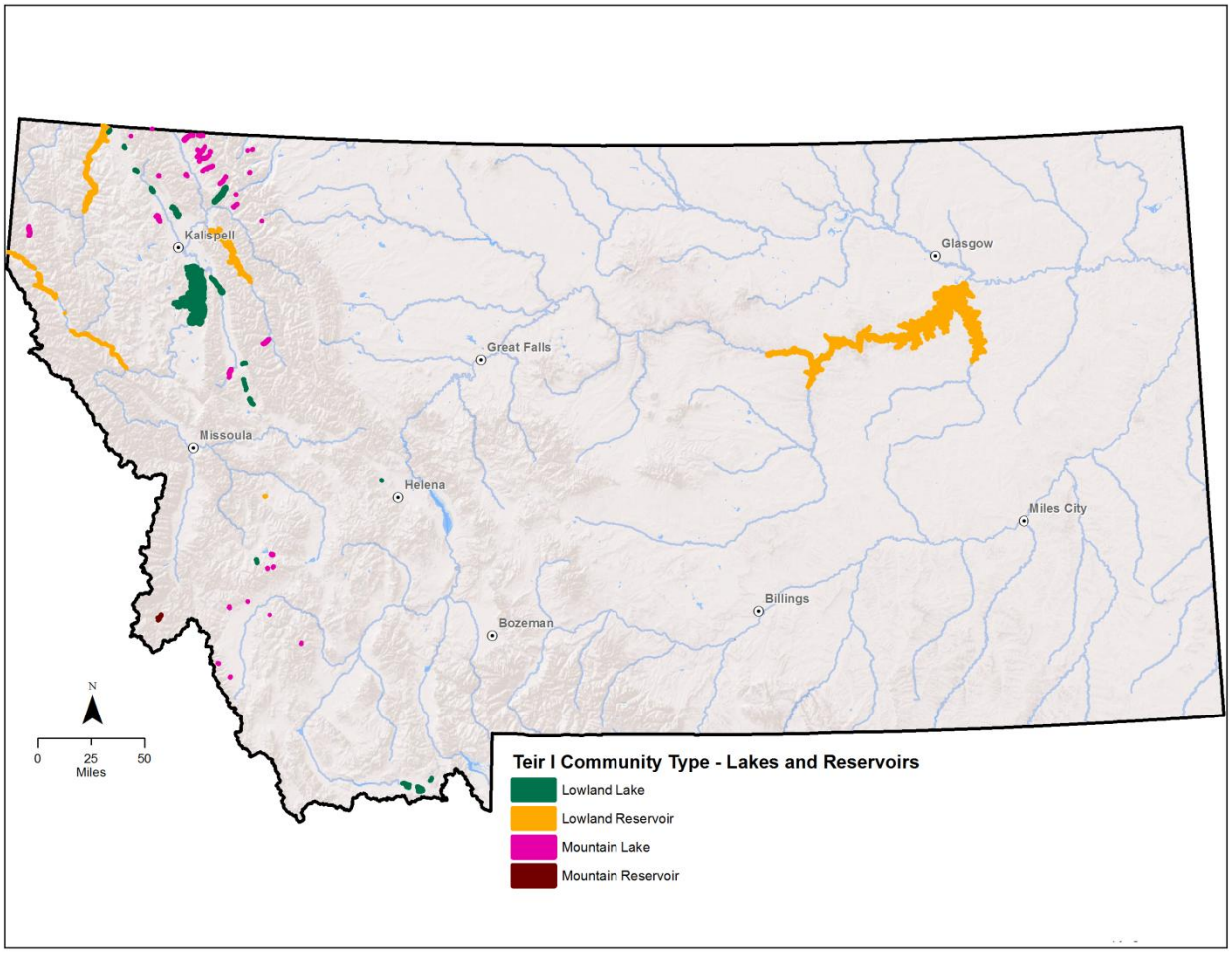

Figure 7. Distribution of Tier I Lakes and Reservoirs

In this SWAP, lakes were categorized as a Tier II community type and reservoirs as a Tier III. However, the technical team acknowledged that some lakes and reservoirs were critical to the persistence of some SGCN, and recommended that specific lakes and reservoirs be elevated to a Tier I community type. The list of these lakes and reservoirs can be found in Appendix G.

Lowland Lakes Associated SGCN

Fish

Arctic Grayling
Blue Sucker
Bull Trout
Lake Trout
Paddlefish
Pallid Sturgeon
Pygmy Whitefish
Sauger
Shortnose Gar
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Lowland Reservoirs Associated SGCN

Fish
Arctic Grayling
Bull Trout
Lake Trout
Paddlefish
Pallid Sturgeon
Pygmy Whitefish
Sauger
Trout-perch
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mountain Lakes Associated SGCN

Fish
Arctic Grayling
Bull Trout
Columbia River Redband Trout
Lake Trout
Pygmy Whitefish
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

Mountain Reservoirs Associated SGCN

Fish
Arctic Grayling
Bull Trout
Columbia River Redband Trout
Westslope Cutthroat Trout
Yellowstone Cutthroat Trout

AQUATIC COMMUNITY TYPE IMPACTS, THREATS, AND ACTIONS

All of the aquatic community types in Montana have similar threats, though the magnitude and urgency of those threats may be different. Likewise, the conservation actions addressing those threats may be different depending on the community type and the geographic area. Some threats can have far-reaching impacts across the entire state affecting all CTGCN and share the same mitigating actions. It is not implied, however, that the identified impacts and threats are *always* impacts and threats. They are only considered so if they negatively affect CTGCN or SGCN.

The following impacts, threats, and corresponding actions were identified by the technical teams, other experts, and/or were summarized from existing management plans or recovery plans. This list does not represent a brainstorming exercise where every action is listed. Rather, this list represents priority actions that have a better likelihood of mitigating and minimizing the associated impacts and threats. Therefore, the listed conservation actions may not represent all actions that should be implemented within a community type or Focal Area. The list of actions should be reviewed for each project to determine relevancy to the project goals, and other actions should be considered if they may benefit the Focal Area, CTGCN, and/or SGCN in question. In addition, not all listed actions are suitable for every community type or situation. Each area must be assessed separately to determine which actions are appropriate.

Broad actions that can address multiple threats and impacts are identified first, and grouped by Association of Fish and Wildlife Agencies' (AFWA) recommended categories to measure effectiveness (AFWA 2011). Actions addressing specific impacts and threats follow.

BROAD ACTIONS FOR AQUATIC COMMUNITY TYPE IMPACTS AND THREATS

Collaboration and Outreach

- Actively participate with private landowners, watershed groups, non-governmental organizations (NGO), state and federal government agencies, local governments, tribes, land trusts, conservation districts, and other interested parties to: ensure work plans consider wildlife habitat needs during planning and implementation; ensure effective cooperation; work collaboratively; and to promote SGCN and habitat conservation while maintaining private land management objectives
- Incorporate Best Management Practices (BMP) when implementing actions outlined in this SWAP
- Encourage counties and communities to use FWP's *Fish and Wildlife Recommendations for Subdivision Development* (FWP 2012a)
- Through press releases and participation in educational programs and public meetings, disseminate information regarding actions, issues, and science involving aquatic community types to foster advocacy for and promote CTGCN and SGCN
- Educate the public and land managers about the high values of CTGCN and how to better manage these habitats in ways that balance their management objectives with the conservation actions outlined in this SWAP
- Provide decision makers with data on impacts and threats to CTGCN and SGCN

- Promote measures to prevent the spread of chytrid fungus (Maxell et al. 2004), whirling disease, and other waterborne diseases during research, monitoring, management, or recreational activities

Habitat Protection

- Continue to utilize Habitat Montana (FWP 1994), Future Fisheries, and other funding sources to support opportunities to conserve CTGCN through fee title acquisitions and conservation easements
- Work with willing landowners, agencies, and organizations to purchase land or acquire conservation easements that support SGCN to: provide access to resources, prevent further habitat fragmentation, and preserve natural habitat function

Planning and Review

- Assist in the review of land use proposals completed by land management agencies that may affect CTGCN and provide recommendations to minimize impacts to CTGCN and SGCN
- Work with other agencies, organizations, and interested parties to promote habitat conservation and management to benefit SGCN
- Consider SGCN and their habitats during development of management plans for WMAs, Fishing Access Sites, and State Parks
- Review proposed private ponds, 310 and 124 projects, and management plans to assure threats to fisheries are minimized
- Follow management direction outlined in the *Montana Statewide Fisheries Management Plan 2013-2018* (FWP 2013a)

Training and Technical Assistance

- Provide technical assistance to local landowners, conservation districts, and federal and state agencies as it pertains to maintaining and enhancing the aquatic habitat, function, and fish assemblage

SPECIFIC IMPACTS AND THREATS TO AQUATIC COMMUNITY TYPES

Water Management (all Aquatic Community Types)

- Altered temperature regime
- Dewatering
- Interbasin transfers
- Irrigation withdrawals
- Reservoir management
- Irrigation diversions and entrainment of fish
- Deteriorating conditions for migratory fish stocks
- Chemical and nutrient runoff

Actions:

- Ensure riparian resiliency through land use management and dam operations to improve instream flows, prevent dewatering, and improve and maintain natural stream form and function to accurately reflect SGCN needs
- Upgrade and mitigate cumulative impacts of irrigation diversions

- Investigate/pursue methods to reduce effects of dewatering and entrainment of fishes
- Reestablish natural flows and flows to intermittent reaches
- For Fort Peck Reservoir, follow guidance in the *Fort Peck Reservoir Fisheries Management Plan 2012-2022* (FWP 2012b)
- Work with appropriate agencies to maintain quality aquatic habitats and to mitigate impacts and threats to CTGCN and SGCN
- Develop a reservoir/river model to better facilitate spawning and rearing habitat needed for optimal growth and survival and to help guide the U.S. Army Corps of Engineers (USACOE) in their annual Master Manual operating planning process
- Work with other agencies and or landowners to upgrade or adopt more efficient agricultural practices and BMPs that benefit stream integrity
- Provide decision makers with data about pollution impacts on SGCN to help them set water quality standards

Habitat Fragmentation (all Aquatic Community Types)

- Downstream transport
- Fish barriers
- Housing/subdivision development
- Roads
- Railroads
- Loss of connectivity

Actions:

- Strategically evaluate opportunities to improve passage and restore connectivity (e.g., to lake system, between main rivers and tributaries) by identifying and removing migration barriers, improving native fish corridors, restoring habitat, and/or by installing fish ladders or other fish passage structures
- Improve minimum reservoir elevations and improve flow in intermittent reach above reservoirs
- Review and comment on subdivision requests that have the potential to impact SGCN and CTGCN and make recommendations based on FWP's *Fish and Wildlife Recommendations for Subdivision Development* (FWP 2012a)
- Prioritize conservation easements and acquisitions adjacent to current conservation investments in order to create contiguous protected habitat that provide habitat linkages across large landscapes

Riparian/Water Body Management (all Aquatic Community Types)

- Incompatible grazing practices
- Incompatible range management practices
- Habitat degradation
- Natural sedimentation
- Rip-rap
- Incompatible timber harvest practices
- Channelization
- Fire recovery
- Landslides
- Encroachment
- Lake eutrophication
- Extirpated or low SGCN populations

Actions:

- Support agency and private conservation activities and management practices that encourage and support sustainable land management practices, maintain or improve riparian vegetation, and maintain streambank and channel stability in excellent condition
- Evaluate forestry BMPs with regards to riparian function and make recommendations to modify if appropriate; support BMPs that promote riparian health
- Participate in land use planning efforts and review proposed actions in drainages to ensure that negative impacts to aquatic CTGCN and SGCN are minimized
- Develop reservoir/river models to better facilitate spawning and rearing habitat needed for optimal growth and survival of associated SGCN
- Encourage and support habitat improvement projects and projects to restore degraded habitat within CTGCN
- Work with willing landowners, land management agencies, conservation districts, watershed groups, and other interested parties on habitat projects using Habitat Montana (FWP 1994), Future Fisheries, SWG, and other funding sources to conserve and promote healthy riparian habitats beneficial to SGCN and overall community type
- Work with counties to update and improve floodplain management to protect habitat important to SGCN
- Identify and remove migration barriers in critical SGCN corridors

Pollution/contamination of Resources (all Aquatic Community Types)

- Coal, oil, gas, Coal Bed Methane, and bentonite exploration and extraction
- Mine contamination
- Urban runoff

Actions:

- Review and comment on energy related development projects that have the potential to impact SGCN and CTGCN and make recommendations based on FWP's *Fish and Wildlife Recommendations for Oil and Gas Development in Montana* (In prep)
- Work with the U.S. Forest Service (USFS) and the Department of Environmental Quality in the development of mine clean-up plans and metals reduction (particularly Hg) and plans to limit runoff and groundwater depletion

Wind Energy (all Aquatic Community Types)

- Habitat fragmentation

Actions:

- Review and comment on energy related development projects that have the potential to impact SGCN and CTGCN and make recommendations based on FWP's *Fish and Wildlife Recommendations for Wind Energy Development in Montana* (In prep)

Non-native Species (all Aquatic Community Types)

- Illegal introductions
- Competition, predation, and hybridization with native species
- Barrier loss
- Expansion of non-native species
- Aquatic Nuisance Species (ANS)
- Nuisance blooms of *Didymosphenia geminate*

Actions:

- Replacement and/or construction and monitoring of fish passage barriers to reduce non-native species movement into areas where they currently do not occur
- Eliminate competing fish species by piscicides, trapping, or electrofishing where they are threatening objectives for CTGCN and/or SGCN
- Prevent illegal introductions and prohibit transport and use of live bait between drainages
- Stock sterile non-native fish for angler harvest
- Manage harvest regulations for the benefit of SGCN
- Protect native species through habitat protection and enhancement and restore or introduce SGCN into suitable waters
- Continue angler education efforts and ANS check stations
- To avoid spread of aquatic invasive species, follow guidance in *Montana's Aquatic Nuisance Species Management Plan* (Montana ANS Technical Committee 2002) and updates or revisions to the plan

Climate Change (all Community Types)

- Habitat alteration (e.g., temperature and precipitation changes)

Actions:

- Continue to evaluate current climate science models and recommended actions
- Continue or establish protocols to monitor thermal data, water flow, and conduct insect surveys to detect change
- Continue efforts to ensure adequate stream flows (e.g., protect instream flows, water leasing)

Harvest of SGCN (Intermountain Rivers and Streams, Mountain Streams, Lowland and Mountain Lakes)

- Angling pressure (localized)
- Illegal harvest (localized)

Actions:

- Continue to make recommendations for harvest regulations to minimize impacts to important populations of SGCN
- Increase enforcement of existing harvest regulations in areas where heavy pressure and illegal harvest are impacting populations
- Educate anglers on proper catch and release methods and correct fish identification